Radioactive Materials Inventory Reduction Plan

This document describes the Ames Laboratory efforts to reduce its inventory of radioactive materials. Comments and questions regarding this plan should be directed to the contact persons listed below:

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Sign-off Record:

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Approved by: Bruce Harmon Date: 12/19/02
Deputy Director

Approved by: John Barton Date: 12/20/02
Director

1.0 REVISION/REVIEW LOG

Environment, Safety, Health & Assurance (ESH&A) will formally review this document at least annually until the plan's goal is achieved.

Revision Number	Effective Date	Contact Person	Pages Affected	Description of Revision
0	12/31/02	J. Beckel	All	Initial Issue

2.0 Purpose, Scope and Introduction

Ames Laboratory radioactive materials research has dwindled over the years, with only parts per million levels occasionally used in primarily analytical research activities and materials balance inventory items used to fill materials preparation orders. Ames Laboratory currently has just over 200 items in its radioactive materials inventory. The Laboratory's goal is to reduce the number of materials to a level necessary to support present research and near term planned research activities and provide adequate calibration source materials necessary to ensure the health and safety of its workers and protection of the public and the environment. It is anticipated that approximately twenty-five (~25) inventoried items can support the Laboratory's research and ES&H activities. Such an inventory would include daily calibration source checks for various types of equipment and a small nuclear materials balance for research and Materials Preparation Center (MPC) activities. The reduction of inventory should allow the laboratory's Health Physics staff to dedicate more of its efforts on new and current research activities involving analytical x-ray units and on decontamination of historically contaminated facilities and the related worker protection issues, rather than managing a mostly unused materials balance.

3.0 Responsibilities

Responsibilities for implementation of this plan include:

Executive Council – The Laboratory Directorship is ultimately responsible for ensuring the success of this plan through review and support of its contents and providing adequate resources for associated costs.

Program Directors and Department Managers – Program Directors / Department Managers should provide information regarding planned future usage of radioactive materials.

Environment, Safety, Health and Assurance (ESH&A) – ESH&A specialists, with assistance and awareness of DOE –Ames Area Office, are responsible for determination of appropriate reuse and disposal vendors for reduction of excess radioactive materials inventory.

4.0 Summary of Radioactive Materials Inventory

Ames Laboratory currently has slightly more than 200 items in its radioactive materials inventory. These items are summarized, with notation of excess and future usage, as follows.

Materials Balance Inventory (MBI) Items

37 kg Thorium, including:	
- 13 kg dioxides	***Excess***
- 10 kg miscellaneous compounds	***Excess***
- 14 kg research metals in various forms	***Excess, but keep ~3kg Thorium crystal bar for MPC***
66 kg Normal Uranium, including:	
- 23 kg trioxides	***Excess***
- 7 kg tetraflourides	***Excess***
- 6 kg nitrate compounds	***Excess***
- 6 kg dioxides	***Excess***
- 21 kg pure metals	***Excess***
- 4 kg research materials in various forms	***Excess***
(Quantity differences due to rounding)	
37 kg Depleted Uranium, including:	
- 16 kg tetraflourides	***Excess***
- 14 kg research materials in various forms	***Excess***
- 7 kg miscellaneous compounds	***Excess, but keep ~ 1 kg depleted Uranium for MPC***
16 g Plutonium	
- 15 g as Pu-239(~1Ci) in PuBe sealed neutron source	***Excess***
87 g Enriched Uranium	
- 31 g highly enriched (> 50%) – UF6 gas (cylinder)	***Excess***
- 55 g low enriched (< 50%) – UF6 gas (cylinder)	***Excess***
- 2 g research material	***Excess***

Non-Material Balance Inventory (MBI) Items

Cs-137, 9.5 Ci sealed calibration source	***Excess***
Cs-137, 3.45 mCi sealed calibration source	***Excess***
Am-Li, 2.15 Ci sealed neutron source	***Excess***
Ra-226. 10 mCi sealed calibration source	***Excess***
Fe-55, 30 mCi irradiated metal	***Keep for Metal & Ceramic Sciences Program***
Miscellaneous Check/Calibration Sources < 1mCi total	***Excess, but keep ~ 20+ items for Radiological Protection Program Activities***

5.0 Description of Planned Actions

5.1 Desired Ames Laboratory Inventory

The Laboratory desires to maintain an inventory of radioactive materials limited to:

Materials Balance Inventory
- 3 kg Thorium - crystal bar utilized by MPC
- 1 kg Depleted Uranium - metal used by MPC

Non-Material Balance Inventory (MBI) Items
- Miscellaneous Check/Calibration Sources (~ 0.2mCi) such as: Am-241, Ba-133, Bi-210, C-14, Cd-109, Cl-36, Cs-137, Co-60, Co-57, I-129, I-131, Na-22, Ni-63, Pa-234, Pb-210, Pm-147, Pu-239, Tc-99, Ra-226, Sr-90, Th-230, Th-232, Tl-204, U-238

- Fe-55 – 30 mCi irradiated metal (used by Metal and Ceramic Sciences Program)

It is anticipated that the Laboratory will maintain a larger inventory than the limited inventory described above because of the difficulty of achieving a disposition path for all excess items.

5.2 Planned Disposition of Excess Items

All materials in inventory are listed through the DOE Nuclear Materials Stewardship Project Office as excess since early CY2002. As of the end of CY2002, there have been no requests for the materials listed. The Materials Balance Inventory (MBI) items will also be listed on the excess inventory list distributed within the DOE. Other DOE Laboratories will thereby have the opportunity to acquire these materials free of charge. The materials not acquired by other facilities will go through an acceptance/approval process to go to Hanford as Low-Level Waste. Some materials may need to be neutralized, but the present acceptance information indicates that most of the materials, including the sealed sources could be disposed under the Hanford Solid Waste Acceptance Criteria.

The following summary listing of the radioactive materials inventory includes disposition notation. The text, *"MSPO/DOE MBI/Hanford*" indicates that the excess material has been listed through the Nuclear Materials Stewardship Project Office as excess as of early CY2002 and will be listed as excess Materials Balance Inventory (MBI) within the DOE and then disposed as Low-Level Waste at Hanford. It is anticipated that most excess items will be disposed as Low-Level Waste at Hanford. The three UF_6 cylinders should eventually be disposed through Portsmouth. The only identified potential disposal route for the PuBe Neutron Source is the Los Alamos National Laboratory Off-site Source Recovery Program (OSR), but presently this path is tentative. Likewise the only known potential disposal route for the AmLi Neutron Source is the Los Alamos National Laboratory Off-Site Recovery Program (OSR), but the Lithium metal is highly reactive and is currently not accepted through OSR. Therefore a disposition path for the AmLi Neutron Source is unclear at this time.

Materials Balance Inventory (MBI) Items

37 kg Thorium, including:

- 13 kg dioxides — ***Excess,*** *MSPO/DOE MBI/Hanford.*
- 10 kg miscellaneous compounds — ***Excess****, MSPO/DOE MBI/Hanford.*
- 14 kg research metals in various forms — ***Excess, but keep ~3kg Thorium crystal bar for MPC****, MSPO/DOE MBI/Hanford.*

66 kg Normal Uranium, including: *(Quantity differences due to rounding)*

- 23 kg trioxides — ***Excess,*** *MSPO/DOE MBI/Hanford.*
- 7 kg tetraflourides — ***Excess,*** *MSPO/DOE MBI/Hanford.*
- 6 kg nitrate compounds — ***Excess,*** *MSPO/DOE MBI/Hanford.*
- 6 kg dioxides — ***Excess,*** *MSPO/DOE MBI/Hanford.*
- 21 kg pure metals — ***Excess,*** *MSPO/DOE MBI/Hanford.*
- 4 kg research materials in various forms — ***Excess,*** *MSPO/DOE MBI/Hanford.*

37 kg Depleted Uranium, including:

- 16 kg tetraflourides — ***Excess,*** *MSPO/DOE MBI/Hanford.*
- 14 kg research materials in various forms — ***Excess, but keep ~ 1 kg depleted Uranium for MPC,*** *MSPO/DOE MBI/Hanford.*
- 7 kg miscellaneous compounds — ***Excess,*** *MSPO/DOE MBI/Hanford. The depleted UF_6 cylinder is planned to go to Portsmouth. This transfer has been put on hold temporarily, due to some conflicts on the Portsmouth side of the deal. Ames Laboratory is ready to transfer this item as soon as authorization is given.*

16 g Plutonium

- 15 g as Pu-239(~1Ci) in PuBe sealed neutron source — ***Excess,*** *The Los Alamos National Laboratory Off-site Source Recovery Program (OSR) is the most likely disposition path, but the program is not accepting this type of source at this time. The OSR has requested approval for acceptance of this type of item. Ames' PuBe source is on the waiting list should approval be obtained.*

87 g Enriched Uranium

- 31 g highly enriched (> 50%) – UF6 gas (cylinder) — ***Excess,*** *The highly enriched UF_6 cylinder is planned go to Portsmouth then eventually to Nuclear Fuels Service (NFS). This transfer has been put on hold temporarily, due to conflicts on the Portsmouth side of the deal. Ames Laboratory is ready to transfer this item as soon as authorization is given.*

- 55 g low enriched (< 50%) – UF6 gas (cylinder) — ***Excess,*** *The lowly enriched UF_6 cylinder is planned to go to Portsmouth. This transfer has been put on hold temporarily, due to some conflicts on the Portsmouth side of the deal. Ames Laboratory is ready to transfer this item as soon as authorization is given.*

- 2 g research material — ***Excess,*** *MSPO/DOE MBI/Hanford.*

Non-Material Balance Inventory (MBI) Items

Cs-137, 9.5 Ci sealed calibration source ***Excess,*** *Item is presently going through acceptance approval for disposal at Hanford via the next Ames Laboratory Low-Level Waste shipment (planned for FY03).*

Cs-137, 3.45 mCi sealed calibration source ***Excess,*** *Item is presently going through acceptance approval for disposal at Hanford via the next Ames Laboratory Low-Level Waste shipment (planned for FY03).*

Am-Li, 2.15 Ci sealed neutron source ***Excess****, The Lithium metal is highly reactive and is currently not accepted through the Los Alamos National Laboratory Off-site Source Recovery Program (OSR).* A disposition path for this source is unclear at this time.

Ra-226. 10 mCi sealed calibration source ***Excess,*** *Item is presently going through acceptance approval for disposal at Hanford via the next Ames Laboratory Low-Level Waste shipment (planned for FY03).*

Fe-55, 30 mCi – irradiated metal ***Keep for Metal & Ceramic Sciences Program***

Miscellaneous Check/Calibration Sources < 1mCi total ***Excess, except ~ 20+ items will be kept for Radiological Protection Program Activities.*** *The items have been listed through the Nuclear Materials Stewardship Project Office as excess as of early CY2002 and will be disposed as Low-Level Waste through Hanford.*